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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JACOB CONNOR and SAIBAL MILTRA

Appeal 2016-001227
Application 12/962,328
Technology Center 1700

Before GEORGE C. BEST, DONNA M. PRAISS, and ELIZABETH M. ROESEL, *Administrative Patent Judges*.

BEST, *Administrative Patent Judge.*

DECISION ON APPEAL

The Examiner rejected claims 1–17 of Application 12/962,328 under 35 U.S.C. § 103(a) as obvious and also rejected claims 6–17 under 35 U.S.C. § 112, ¶ 2 as indefinite. Non-Final Act. (March 31, 2014). Appellants[1] seek reversal of these rejections pursuant to 35 U.S.C. § 134(a).[2] Because at least

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[1] Jacob Connor and Saibal Miltra are identified as the real parties in interest. Appeal Br. 2.

[2] Appellants' Reply Brief states: "Claims 6–9 will be cancelled in an amendment contemporaneous to the filing of this brief." Reply Br. 8. The record, however, does not indicate that such an amendment was filed. Accordingly, claims 6–9 of the '328 Application remain part of this appeal.

one of the claims on appeal has been rejected twice, we have jurisdiction under 35 U.S.C. § 6.

For the reasons set forth below, we AFFIRM.

BACKGROUND

The '328 Application describes methods for fabricating ion passage membranes for electrochemical cells. Spec. 2–3. Appellants characterize their invention as follows:

> The invention of claim 1 and its dependent claims is a method for constructing a membrane. The pulse energy of a laser is fixed at a constant value. Knowledge of the characteristics of the material to be ablated leads to an ablation value. The ablation value is a ratio of the laser fluence value to the threshold fluence value of the material. As the laser fluence value is lowered to approach a 1:1 ratio with the threshold fluence value, ion passage channels created by the present invention become both smaller and more-predictably sized.

Appeal Br. 9.

Claim 1 is representative of the '328 Application's claims and is reproduced below from the Claims Appendix of the Appeal Brief:

> 1. A method for fabricating a membrane for an ion-exchange electrochemical cell, said method comprising:
>
> fixing the pulse energy of a laser;
>
> identifying an ablation value defined by a ratio of a laser fluence value to a threshold fluence value of a dielectric substrate; and
>
> laser ablating said substrate with an ablation value less than 4 to form a ion passage channel.

Id. at 18.

REJECTIONS

On appeal, the Examiner maintains the following rejections:

1. Claims 6–17 are rejected under 35 U.S.C. § 112, ¶ 2 as being indefinite. Non-Final Act. 2.
2. Claims 1–5 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Kovarsky[3] and Brennen.[4] Non-Final Act. 4.
3. Claims 6–9 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Kovarsky, Brennen, and Newman.[5] Non-Final Act. 7.
4. Claims 10–17 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Kovarsky, Brennen, and Newman. Non-Final Act. 9.

DISCUSSION

Rejection 1. The Examiner rejected claims 6–17 as indefinite. Non-Final Act. 2. Claim 6 reads:

> 6. The method of claim 5 wherein said laser ablation step includes pulse ablating said substrate to form said ion passage channel diameter at said pulse duration clipped *to permit said ion channel passage diameter to be reproduced within 10%.*

Appeal Br. 18 (emphasis added).

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[3] US 2004/0065543 A1, published April 8, 2004.

[4] US 6,919,162 B1, issued July 19, 2005.

[5] US 2006/0045150 A1, published March 2, 2006.

In rejecting claims 6–17, the Examiner concluded that

> [i]n claims 6–17, it is unclear what is meant by "said ion passage channel diameter to be reproduced within" the claimed values (i.e. 10%, 5%, 2%, 1%). For purpose of examination, *the Examiner will consider the ion passage channel diameter to be reproduced within 10%, 5%, 2%, and 1% of a predefined uniform passage channel diameter.*

Non-Final Act. 2 (emphasis added).

In response, Appellants state that the Examiner correctly interpreted the claim language in question and argue that the claims are not indefinite. Appeal Br. 17 ("Examiner's suppositions of reproducibility are correct . . . ." (citing Spec. 2:3–9, 3:5–18, 19:6–14)).

After reviewing the '328 Application's claims and the cited Specification passages, we agree with Appellants that claims 6–17 are not indefinite. Claim 6 depends from claim 5, which recites "the step of predefining a uniform passage channel diameter of said ion passage channel."[6] Claim 10 similarly recites the step of "predefining a uniform passage channel diameter of an ion passage channel." These recitations provide antecedent basis for "said ion passage channel diameter" in claims 6 and 10. When read in view of these antecedents, the meaning of the claim limitation quoted by the Examiner is reasonably clear. The diameter to be "reproduced" within 10%, 5%, 2%, or 1% is the diameter that has been predefined in accordance with the "predefining" step of claim 5 or 10. Our

[6] The last word of claim 5, "diameter," appears to be extraneous and should be deleted. If prosecution of the '328 Application continues, correction is required.

interpretation is supported by the Specification, which includes the following description of the process:

> A user predefines a uniform passage diameter of the ion passage. The substrate undergoes pulse ablating to form the ion passage with the uniform ion passage diameter at a pulse duration timed to permit the uniform ion passage diameter to be reproduced within 10% at a constant ablation value.

Spec. 3:13–16. Accordingly, we determine that the claim language when viewed in light of the specification reasonably apprises those of skill in the art of the scope of claims 6–17.

Rejections 2–4. Appellants argue for reversal of the obviousness rejections in the Non-Final Action with respect to two groups of claims: (1) Group I comprising claims 1–9, and (2) Group II comprising claims 10–17. Appeal Br. 7. We address each group of claims separately.

Group I. The claims in this group are subject to grounds of rejection 2 and 3. *See* Non-Final Act. 4–9. Appellants argue for reversal of these grounds of rejection based upon limitations in claim 1. Accordingly, we limit our analysis to claim 1, and claims 2–9 will stand or fall with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(iv) (2014).

In rejecting claim 1, the Examiner found that the combination of Kovarsky and Brennen describes or suggests each limitation recited in claim 1 except for the use of an ablation value to set to the power of the laser pulse. Non-Final Act. 4–6. With respect to this limitation, the Examiner found that "Brennen is silent [as] to said ablation value is defined by a ratio of a laser fluence value to a threshold fluence value of said dielectric substrate." *Id.* at 5. The Examiner further found that Brennen teaches that laser ablation of a substrate has to occur above the lower threshold fluence value of the substrate. *Id.* (citing Brennen col. 8, ll. 48–53). The Examiner

also found that "the fluence is one factor that controls the depth of said channels and apertures in said substrate." *Id.* at 5–6 (citing Brennen col. 13, ll. 19–26, 44–54). Based upon these findings, the Examiner reasoned that a person having skill in the art would have been motivated to control the laser fluence value to be at a certain fluence ratio for the purpose of effectively ablating the substrate and obtaining channels in the substrate having a certain depth. *Id.* at 6.

Appellants argue that the Examiner erred by concluding that the combination of Kovarsky and Brennen describes or suggests the creation of ion passage channels using laser energy at levels specified in claim 1. Appeal Br. 9–15. In particular, Appellants argue that the Examiner erred by finding that the combination of Kovarsky and Brennen suggests the use of a laser to create ion passage channels at an ablation value less than four as recited in claim 1. *Id.* at 11.

We are not persuaded by Appellants' arguments. Appellants admit that Brennen describes the requirement that "the laser fluence value is above the material threshold value." Appeal Br. 14. In other words, Appellants agree that Brennen describes the use of an ablation value greater than 1. Appellants correctly note that Brennen does not describe any upper limit to the ablation value used in its process. Thus, Appellants agree that Brennen describes a process that uses ablation values within a range that encompasses the range claimed by Appellants. This is sufficient to establish a prima facie case of obviousness. *In re Harris*, 409 F.3d 1339, 1341 (Fed. Cir. 2005) (a prima facie case of obviousness typically exists when the ranges of a claimed composition overlap the ranges disclosed in the prior art); *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003) (same); *In re Boesch*, 617 F.2d 272, 275 (CCPA 1980). The cited teachings of Brennen are sufficient

to establish that ablation value is a results effective variable for controlling the depth of a channel, further reinforcing the sufficiency of the Examiner's prima facie case. *Boesch*, 617 F.2d at 276.

Appellants complain that

> [t]here is no indication that Brennen's ablation value is 4 or less; a fluence to material threshold value can be significantly greater than 4 and still produce the surface features that Brennen seeks. Applicants' [sic] control their ablation to an ablation value of 4 or less to create predictable structure sizes (that are small) with uniform structure configurations. Use of ablation ratios to control [the size and uniformity] of specific structure features and uniformity is not a concern of Brennen; the result of Brennen's ablation is "non-uniform" to form a structure like that of his FIG. 4E.

Appeal Br. 14 (internal citation omitted).

Appellants, as demonstrated above, are arguing that their claimed range of ablation values is critical to conferring uniformity of size to the surface features they create. Appellants, however, have not identified evidence sufficient to show that the use of an ablation value less than 4 is critical or otherwise yields unexpected results. It is well settled that arguments of counsel cannot take the place of factually supported objective evidence. *See, e.g.*, *In re Huang*, 100 F.3d 135, 139–40 (Fed. Cir. 1996); *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984).

We have considered the case law cited by Appellants. Reply Br. 3–5. Appellants' reliance on *In re Rijckaert*, 9 F.3d 1531 (Fed. Cir. 1993) is inapposite. As discussed above, Brennen does disclose the relationship between laser fluence and material fluence and the effects of that relationship upon the use of a pulsed laser radiation to ablate material from the substrate. Brennen col. 8, ll. 48–53, col. 13, ll. 19–26, 44–54. This is an important distinction from the factual situation in *Rijckaert*, where the prior

art was silent as to the claimed relationship between particular variables. *See Rijckaert*, 9 F.3d at 1533.

Appellants' reliance upon *In re Baird*, 16 F.3d 380 (Fed. Cir. 1994), is similarly misplaced. *Baird* is discussing obviousness of a particular chemical species in the context of a generic disclosure. *Baird*, therefore, is addressing a factual situation that is very different from the one at hand.

In re Roemer, 258 F.3d 1303 (Fed. Cir. 2001), also is factually distinguishable from this case. In *Roemer*, the Federal Circuit concluded that claim 1 of Roemer's reissue application is nonobvious because the prior art "[gave] only general guidance as to the particular form of the claimed invention or how to achieve it. This 'obvious to try' suggestion of the Smith patent does not render claim 1 of the Roemer reissue application obvious . . . ." *Roemer*, 258 F.3d at 1309–10 (internal quote marks and citation omitted). The Federal Circuit's conclusion was based upon the fact that the Smith patent neither described or suggested the claimed invention nor disclosed the complex mathematics required to arrive at the claimed invention. *Id.* at 1309. In this case, however, the record before us is devoid of evidence that complex mathematics are required to arrive at the claimed invention from the prior art. Furthermore, as discussed above, Brennen describes the use of multiple laser pulses to create through holes in a substrate. *See* Brennen col. 4, ll. 1–11. Thus, *Roemer* is factually inapposite to this case.

In our view, the results of this case are controlled by the Supreme Court's decision in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398 (2007). As discussed above, in the absence of evidence of criticality or unexpected results, Appellants' claims are directed to known elements that have been combined according to known methods to yield predictable

results. Such combinations are likely to be obvious. *Id.* at 416. Although the cited prior art does not specifically point to the claimed ablation value range, it has been established that "the [obviousness] analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR*, 550 U.S. at 418; *see also In re Fritch*, 972 F.2d 1260, 1264–65 (Fed. Cir. 1992) (a reference stands for all of the specific teachings thereof as well as the inferences one of ordinary skill in the art would have reasonably been expected to draw therefrom).

For the reasons set forth above, we affirm the Examiner's rejection of claims 1–9 of the '328 Application.

Group II. The claims in this group—claims 10–17—are subject to ground of rejection 4. *See* Non-Final Act. 9. Appellants argue for reversal of this rejection on the basis of limitations of independent claim 10. Dependent claims 11–17 will stand or fall with claim 10. 37 C.F.R. § 41.37(c)(1)(iv) (2014).

The Examiner concluded that claim 10 was unpatentable over the combination of Kovarsky, Brennen, and Newman. Non-Final Act. 9. In particular, the Examiner relied upon Newman for its disclosure that it is well known to clip laser pulse duration during laser ablation. *See id.* at 8 (citing Newman ¶¶ 25–29).

Appellants argue that the Examiner's conclusion is erroneous because the combination of references relied upon by the Examiner does not teach "clipping to the extent that would be necessary to teach Applicants' claimed invention, whereas Applicants utilize clipping on the order of 1–150 picoseconds, Application, p. 9, Brennen speaks in terms of microseconds."

Appeal Br. 16–17. This argument is not persuasive because claim 10 is silent regarding the duration of the clipped laser pulses.

Appellants also argue that the rejection of claim 10 should be reversed because

> Brennen does not teach forming channels, as cited by the Examiner, to include specific predetermine[d] geometries. Instead, Brennen teaches the formation of surface features with predetermined geometries. See e.g., Col[.] 10, lines 36–44. Brennen never describes the uniform conformity in size of these features or tends to quantify them with the nearest neighbor.

Appeal Br. 16.

This argument is not persuasive because, as the Examiner points out, Brennen describes a desire to form channels and apertures with a wide variety of geometries using a laser ablation technique. Non-Final Act. 8 (citing Brennen col. 13, ll. 19–26); *see also* Brennen Figs. 5–10 (depicting formation of multiple through channels); col. 3, l. 56–col. 4, l. 11 (describing prior art methods for creating through holes in a substrate).

In view of the foregoing, we affirm the Examiner's rejection of claims 10–17.

CONCLUSION

For the reasons set forth above, we reverse the rejection of claims 6–17 as indefinite. We affirm the rejection of claims 1–5 as unpatentable over the combination of Kovarsky and Brennen and the rejections of claims 6–17 as unpatentable over the combination of Kovarsky, Brennen, and Newman.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED